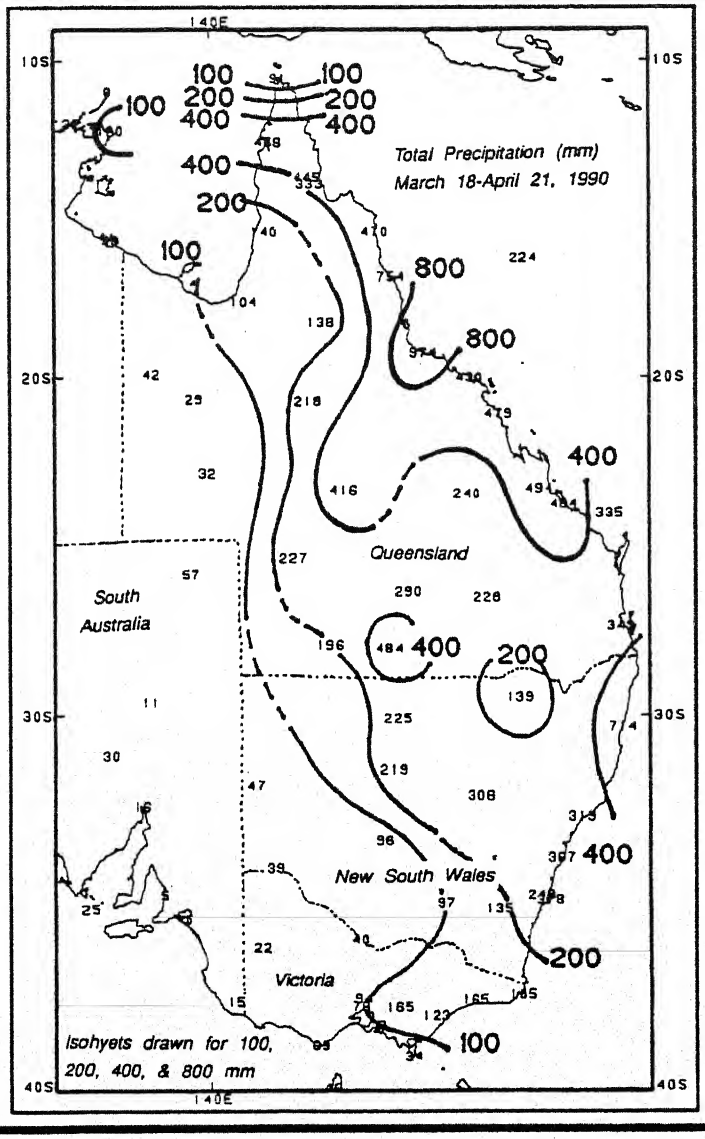
CLIMATE ANALYSIS CENTER

CONTAINS:
SPECIAL ON
AUSTRALIA'S
HEAVY RAINS

WEEKLY CLIMATE BULLETIN

No. 90/16 **Washington, DC** **April 21, 1990**



AFTER EXPERIENCING AN EXTREMELY DRY SUMMER RAINY SEASON IN NORTH-EASTERN AUSTRALIA, RAINFALL SUBSTANTIALLY INCREASED AROUND MID-MARCH, JUST WHEN THE RAINY SEASON WOULD USUALLY DRAW TO AN END. HEAVY RAINS EVENTUALLY ENCOMPASSED MUCH OF QUEENSLAND, NEW SOUTH WALES, AND VICTORIA THE PAST FEW WEEKS, CAUSING WIDESPREAD FLOODING, THE LOSS OF SEVERAL LIVES, AND SEVERE PROPERTY DAMAGE. THIS EVENT WAS REMINISCENT OF LAST MARCH'S "BIG WET" IN CENTRAL AND SOUTH-EASTERN AUSTRALIA.

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL WEATHER SERVICE–NATIONAL METEOROLOGICAL CENTER

CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- Highlights of major climatic events and anomalies.
- U.S. climatic conditions for the previous week.
- U.S. apparent temperatures (summer) or wind chill (winter).
- U.S. cooling degree days (summer) or heating degree days (winter).
- Global two–week temperature anomalies.
- Global four–week precipitation anomalies.
- Global monthly temperature and precipitation anomalies.
- Global three–month precipitation anomalies (once a month).
- Global twelve–month precipitation anomalies (every three months).
- Global three–month temperature anomalies for winter and summer seasons.
- Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF APRIL 21, 1990

Central United States:

SOUTH–CENTRAL PLAINS INUNDATED.

:all waves of low pressure along a stationary front generated several nderstorm outbreaks that dumped as much as 200 mm of rain on 'theastern Texas, eastern and southern Oklahoma, and northwestern kansas. Most of the precipitation fell at intense rates, and were :asionally accompanied by damaging wind gusts and large hail. rtunately, only light to moderate precipitation (between 20 mm and mm) was observed across the remainder of the abnormally wet ion [14 weeks].

Eastern Siberia and Western North America:

MILD WEATHER CONTINUES.

hough the widespread, excessive positive departures of the previous ek ended, above normal temperatures persisted across the region. :ekly temperatures averaged as much as 13°C above normal in eria while departures ranged between +3°C and +7°C in Canada l the United States [8 weeks].

East–Central South America:

DRIER WEATHER FINALLY RETURNS.

lated locations across southern Brazil, southeastern Paraguay, iguay, and northeastern Argentina measured up to 207 mm of rain m scattered thundershowers. Most of the affected area, however, orded only moderate rainfall totals (50 mm to 100 mm) for the d successive week, ending the prolonged wet spell [Ended after 13 eks].

Southeastern Europe and Adjacent Middle East:

STORM SYSTEMS BRING RELIEVING RAINS.

derate to heavy rainfall (up to 169 mm) drenched portions of Italy, goslavia, and Albania while lighter amounts across Greece and stern Turkey were sufficient to alleviate severe short–term moisture. nger–term deficits, however, are still quite significant, and itinuing ample precipitation will be necessary for complete recovery m one of the worst droughts of this century [Ended after 21 weeks].

5. Coastal Equatorial Africa:

SCATTERED HEAVY RAINFALL REPORTED.

Some relief from the slow start to the rainy season occurred across the region as tropical thunderstorms brought heavy rainfall to scattered locations from Guinea eastward to Benin. Up to 110 mm moistened portions of Ghana while 30 mm to 80 mm generally fell across Benin and Togo. In addition, scattered totals of 40 mm to 75 mm were measured in portions of Burkina Faso, Cote d'Ivoire, Guinea, and Liberia. Unfortunately, many areas remained quite dry, particularly in Niger, Mali, Guinea–Bissau, Sierra Leone, and Cameroon, as most areas appeared to receive either heavy rainfall or none at all [5 weeks].

6. Taiwan, Southern Japan, and Southern China:

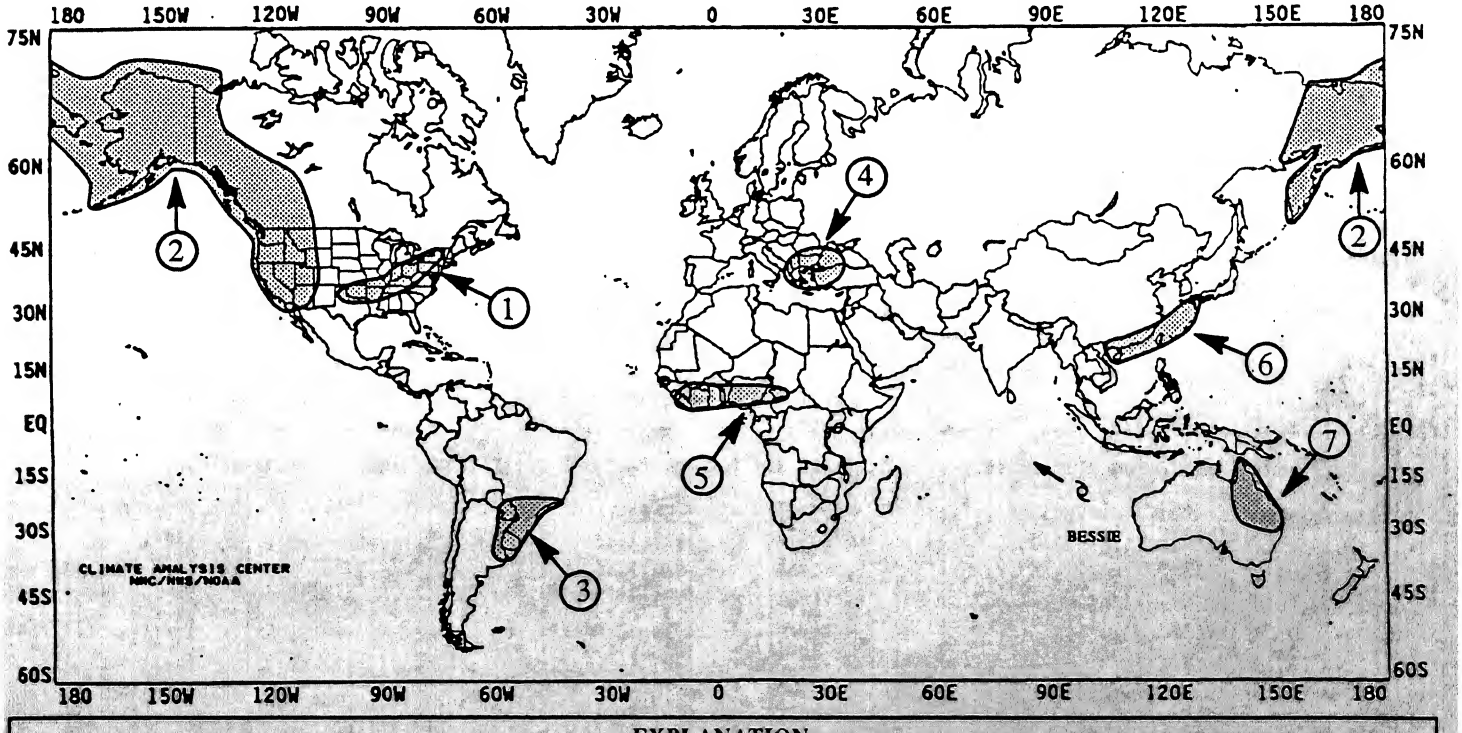
TORRENTIAL DOWNPOURS BATTER MANY AREAS.

Inundating rainfall deluged Taiwan as repeated outbreaks of thundershowers dumped as much as 577 mm on the island. In addition, ample rainfall continued along the southern coastline of China and across Kyushu Island, Japan where 80 mm to 150 mm were measured. Most locations in Taiwan and coastal southeastern China have now recorded more than twice the normal rainfall during the past four weeks [4 weeks].

7. Eastern Australia:

ANOTHER "BIG WET".

After exceptionally light rainfall was recorded during the typically wet summer season across northeastern Australia, intense tropical thunderstorm activity has brought deluging rainfall and widespread flooding to eastern portions of the Continent during the past five weeks (in which the rainy season would normally be ending). More excessive rainfall battered the region last week as up to 213 mm were observed. Portions of interior east–central Australia have recorded more than ten times the normal rainfall during the past five weeks, and up to 917 mm of rain have pelted portions of northeastern Queensland during the same period (see Special Climate Summary) [5 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.

MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long–term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF APRIL 15 – APRIL 21, 1990

After a chilly start to the week, temperatures slowly moderated across the eastern half of the nation, but weekly averages were still slightly below normal. Some parts of the region, particularly the western Ohio and Tennessee Valleys, have now experienced colder than usual conditions since mid–March, quite a contrast from the unseasonably mild January, February, and first half of March. Abnormally warm weather, however, continued throughout the West and spread eastward into the north–central U.S. Once again, strong thunderstorms dumped copious rains on the south–central Great Plains and lower Mississippi Valley, producing flash flooding in northern Texas, eastern Oklahoma, and western Arkansas (see Figure 1). Up to 4 inches of snow blanketed portions of the upper Midwest and upper Great Lakes during late Sunday and early Monday. Most of Alaska recorded above normal temperatures and generally light precipitation, with the exception of heavy rains in the extreme southeastern part of the state, while Hawaii observed warmer than usual conditions and little or no rainfall.

As the week commenced, a cold front located over the nation's midsection slowly pushed eastward while a second cold front moved southeastward out of Canada into the northern Plains. An upper–air trough of low pressure generated scattered showers and thunderstorms from southern New England southward into Florida while a Pacific storm system approached California and brought light rain showers to southern parts of the state. As the southern section of the first cold front stalled across the south–central Great Plains and lower Mississippi Valley, severe weather developed in Texas, Oklahoma, and Arkansas. By early Tuesday, readings had plunged into the teens in the Dakotas and Nebraska as Arctic air invaded the north–central U.S. behind the second cold front.

During mid–week, the second cold front had trekked eastward off the Atlantic Coast and southward into the Gulf of Mexico as high pressure dominated the eastern and central United States. Sub–freezing temperatures were observed in the Ohio Valley, New England, and mid–Atlantic. In the southern Plains, the now–stationary cold front combined with an upper–level disturbance to produce another batch of intense thunderstorms in eastern New Mexico, western Texas, Colorado, and Oklahoma. Farther west, a weak frontal system penetrated the Pacific Northwest, generating light rain along the coast.

Towards the week's end, a reinforcing shot of cold air slipped southeastward from Canada into the northeastern quarter of the country. A trough of low pressure triggered showers and thunderstorms in the Ohio and Tennessee Valleys on Friday, and across the mid–Atlantic and Southeast on Saturday. In the West, the weak frontal system slowly progressed eastward, producing scattered showers and thunderstorms in the Great Basin and the northern Rockies and Intermountain West. One of the thunderstorms spawned a tornado west of Kimberly, ID.

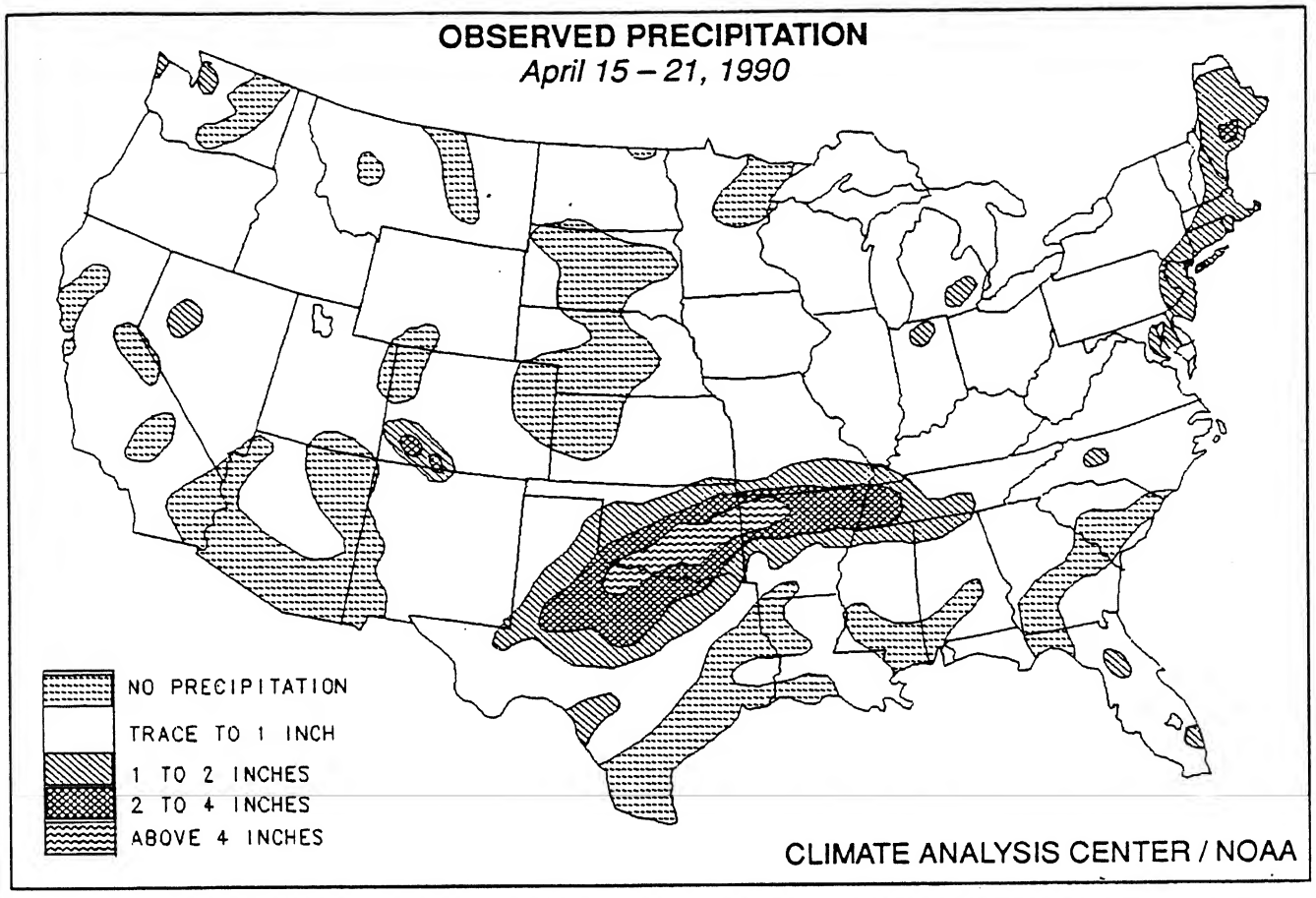
According to the River Forecast Centers, the greatest weekly precipitation totals (more than 2 inches) were recorded in northern Texas, central and eastern Oklahoma, the northern half of Arkansas, southern Tennessee, and northern Alabama (see Table 1). In eastern Oklahoma, several locations measured between 5 and 8 inches of rain during the week, and flooding was common as the rains fell on already–saturated ground. Elsewhere, light to moderate amounts occurred along the Pacific Northwest Coast, in the Great Basin, southern California, the northern and southern thirds of the Rockies and Plains, throughout the Midwest, the Tennessee Valley, the mid–Atlantic, and New England, and along the eastern Florida coast. Little or no precipitation fell on the northern Intermountain West, the central Pacific Coast, the Southwest, the central Rockies and Plains, the upper Midwest, along the Gulf Coast, and in the southern Atlantic Coast states.

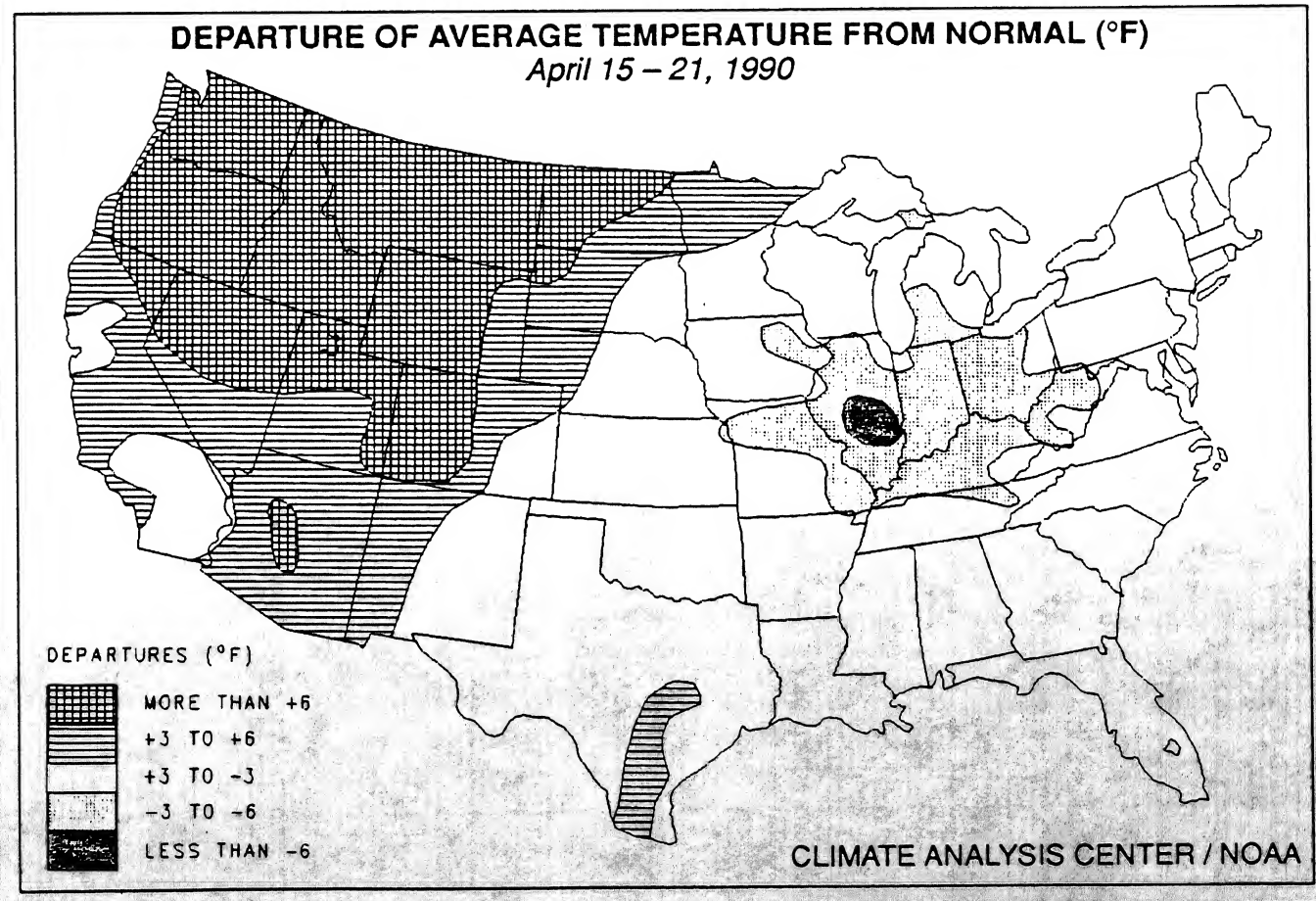
Unusually warm weather prevailed across the West for the fifth straight week, with weekly departures exceeding +10°F in the north–central Intermountain West and Rockies (see Table 2). Highs topped 80°F as far north as southern Washington while the Dakotas and eastern Montana approached 90°F. In Florida, temperatures at a few locations topped 90°F. Several stations in these regions set new daily maximum temperature records during the week.

In contrast, temperatures averaged below normal across the eastern half of the U.S. with the exception of the western Gulf Coast states, southern Florida, and the upper Midwest. The greatest negative departures (between –4°F and –6°F) were observed in the lower Ohio Valley and middle Great Lakes region (see Table 3). Many stations established new daily record lows during mid–week as the northern Plains recorded readings in the teens (e.g. 10°F at Valentine, NE on April 17) and most of the lower Midwest and mid–Atlantic dropped below freezing.

TABLE 1. Selected stations with 2.00 or more inches of precipitation for the week.

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
FORT SMITH, AR	5.83	HUNTSVILLE, AL	2.82
FAYETTEVILLE, AR	5.36	MEMPHIS NAS, TN	2.74
WICHITA FALLS, TX	4.43	BLYTHEVILLE AFB, AR	2.61
MCALESTER, OK	4.10	STEPHENVILLE, TX	2.57
HARRISON, AR	3.74	TULSA, OK	2.55
KODIAK, AK	3.69	ANNETTE ISLAND, AK	2.55
FT. SILL/HENRY POST AAF, OK	3.56	HOBART, OK	2.34
OKLAHOMA CITY, OK	3.33	ALTUS AFB, OK	2.19
ABILENE/DYESS AFB, TX	3.28	MUSCLE SHOALS, AL	2.16
OKLAHOMA CITY/TINKER AFB, OK	3.17	AUGUSTA, ME	2.05
LITTLE ROCK AFB, AR	2.85	MEMPHIS, TN	2.05
JACKSON, TN	2.83	NEW YORK/LA GUARDIA, NY	2.00


OBSERVED PRECIPITATION
April 15 – 21, 1990
NO PRECIPITATION
TRACE TO 1 INCH
1 TO 2 INCHES
2 TO 4 INCHES
ABOVE 4 INCHES
CLIMATE ANALYSIS CENTER / NOAA


DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)
April 15 – 21, 1990
DEPARTURES (°F)
MORE THAN +6
+3 TO +6
+3 TO -3
-3 TO -6
LESS THAN -6
CLIMATE ANALYSIS CENTER / NOAA

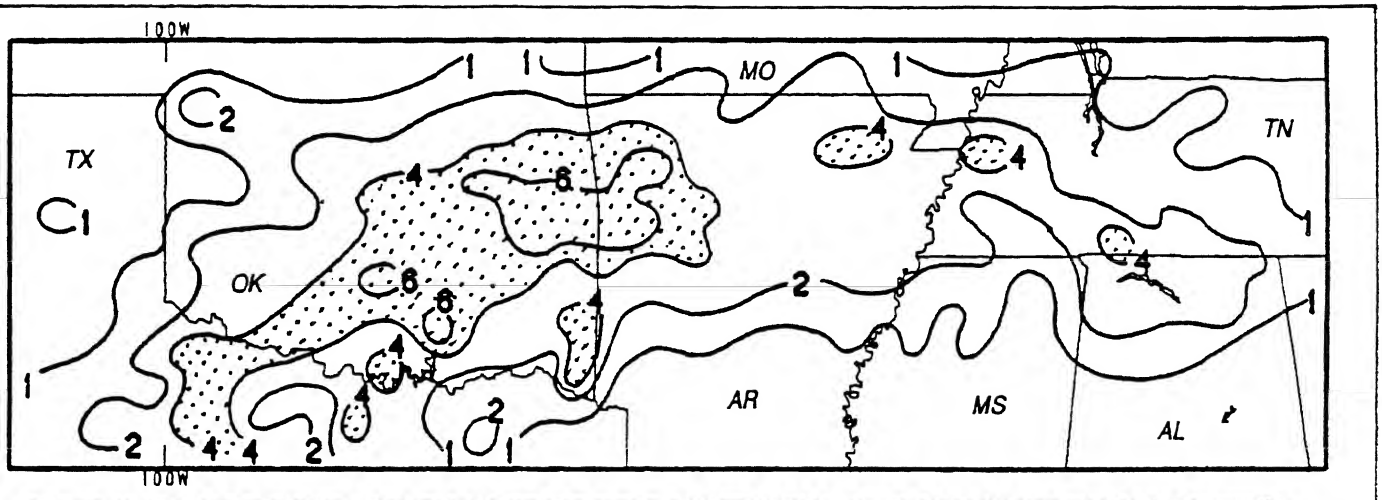


Figure 1. Total precipitation (inches) during the week of April 15-21, 1990, based upon first-order synoptic, airways, and the River Forecast Centers stations. Isohyets are only drawn for 1, 2, 4, and 6 inches, and dotted areas are more than 4 inches. Once again, heavy precipitation deluged parts of the south-central Great Plains and the lower Mississippi Valley, producing severe flooding. Most of this region has already recorded more than twice the normal precipitation since January 1, and thunderstorm activity was expected to continue in the area into the following week (April 22-28).

TABLE 2. Selected stations with temperatures averaging 9.0°F or more ABOVE normal for the week.

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
BURLEY, ID	+13.7	60.1	KING SALMON, AK	+10.1	42.4
BURNS, OR	+13.2	57.0	MCGRATH, AK	+10.1	38.9
BOISE, ID	+12.8	62.0	MEDFORD, OR	+9.9	60.7
REDMOND, OR	+12.8	56.8	PENDLETON, OR	+9.7	60.6
BETHEL, AK	+12.6	37.4	WINNEMUCCA, NV	+9.6	55.6
IDAHO FALLS, ID	+12.5	56.6	GRAND JUNCTION, CO	+9.4	61.7
BAKER, OR	+12.3	57.1	WORLAND, WY	+9.4	55.8
POCATELLO, ID	+12.0	57.4	MILES CITY, MT	+9.4	55.6
LEWISTON, ID	+11.6	62.4	ANIAK, AK	+9.4	38.5
OMAK, WA	+11.6	60.8	BUTTE, MT	+9.2	47.7
ELKO, NV	+11.0	55.0	WALLA WALLA, WA	+9.0	62.6
SALT LAKE CITY, UT	+10.8	60.4	BILLINGS, MT	+9.0	54.5
ROCK SPRINGS/SWEETWATER,WY	+10.8	51.4			

TABLE 3. Selected stations with temperatures averaging 3.0°F or more BELOW normal for the week.

	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
	-6.4	48.6	SOUTH BEND, IN	-3.4	46.2
	-5.1	52.4	FINDLAY, OH	-3.4	46.6
	-4.8	48.6	FORT WAYNE, IN	-3.4	47.0
	-4.4	51.6	MOLINE, IL	-3.4	48.2
DIFORD, KY	-4.3	53.3	MORGANTOWN, WV	-3.4	49.8
IIE, MI	-4.2	35.1	COLUMBUS, OH	-3.3	49.1
	-4.2	42.2	PARKERSBURG/WOOD CO., WV	-3.3	51.7
	-4.2	47.1	TOLEDO, OH	-3.2	45.7
	-4.0	50.7	HUNTINGTON, WV	-3.2	53.9
	-3.9	48.8	DEL RIO, TX	-3.2	69.3
	-3.9	56.4	COLUMBIA, MO	-3.1	53.4
	-3.7	43.4	CLEVELAND/HOPKINS, OH	-3.0	46.4
	-3.7	45.9	CEDAR RAPIDS, IA	-3.0	48.1
	-3.6	48.8	KANSAS CITY/INTL., MO	-3.0	54.1
	-3.6	55.6	ST. LOUIS, MO	-3.0	54.2
	-3.5	44.0	BOWLING GREEN, KY	-3.0	55.3
	-3.4	44.8			

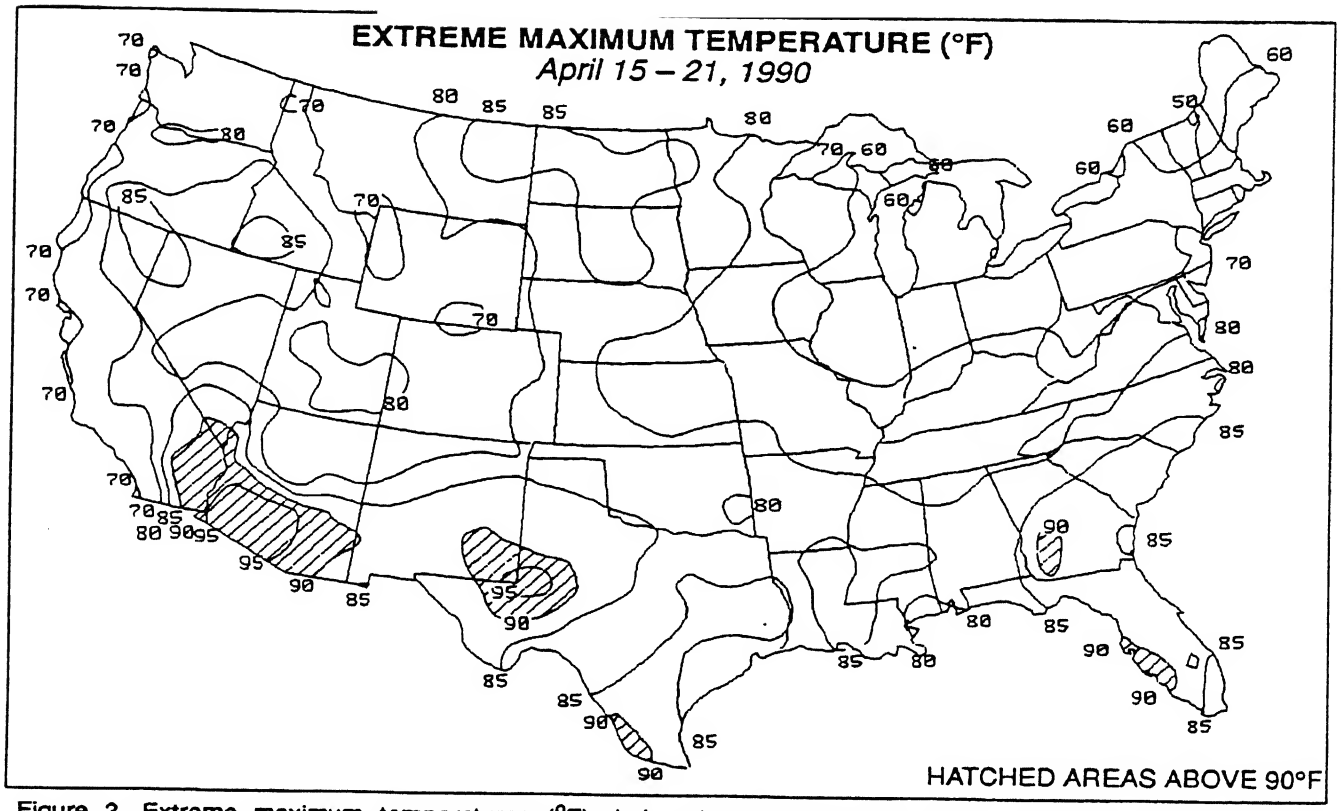
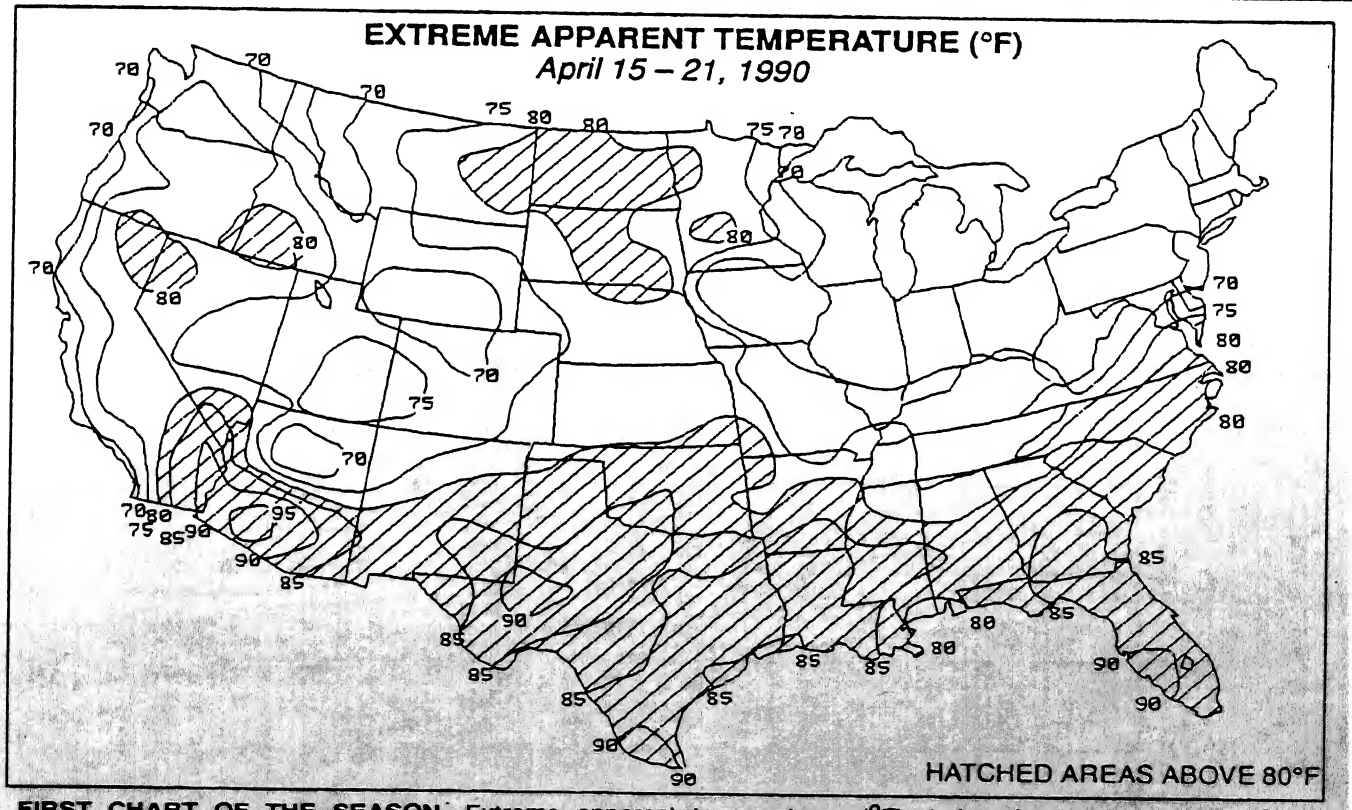


Figure 2. Extreme maximum temperatures (°F) during the week of April 15-21, 1990. Shaded areas are above 90°F, and isotherms are drawn for every 10°F starting at 50°F and for every 5°F starting at 85°F. Unseasonably warm weather prevailed across most of the western U.S. throughout the week as readings in the eighties extended as far north as southern Washington. Farther east, after a cold start to the week, temperatures rebounded into the middle to upper eighties in the northern Great Plains and extreme southern Saskatchewan and Manitoba.



FIRST CHART OF THE SEASON. Extreme apparent temperatures (°F) during the week of April 15-21, 1990. Shaded areas are above 80°F, and isotherms are drawn for every 5°F starting at 70°F. Although temperatures were unseasonably high last week, the humidity was relatively low, producing minimal heat stress across the country. The few exceptions included the desert Southwest, southern Texas, and southwestern Florida, where apparent temperatures surpassed 90°F, which is categorized in the extreme caution range. For additional details on apparent temperatures, refer to the next page (page 6).

APPARENT TEMPERATURE

ne apparent temperature is a measure of human discom-rt due to combined heat and high humidity. It was eveloped by Dr. R. G. Steadman (1979) and is based n studies of human physiology and textile (clothing) science. ne apparent temperature is designed so that apparent mperature exceeds the actual air temperature when umidity is relatively high. The apparent temperature then easures the increased physiological heat stress and dis-mfort associated with higher than comfortable humidities. ote that the apparent temperature is less than the ac-al air temperature when humidity is relatively low and at the apparent temperature indicates the reduced stress nd increased comfort associated with the higher rate of vaporative cooling of the skin.

pparent temperatures greater than 80°F (27°C) are likely produce some discomfort. Values in excess of 105°F 1°C) may be dangerous and even life-threatening, with vere heat exhaustion or heat stroke possible if the ex-sure is prolonged or physical activity is high. The degree stress may vary with age, health, and body characteris-s.

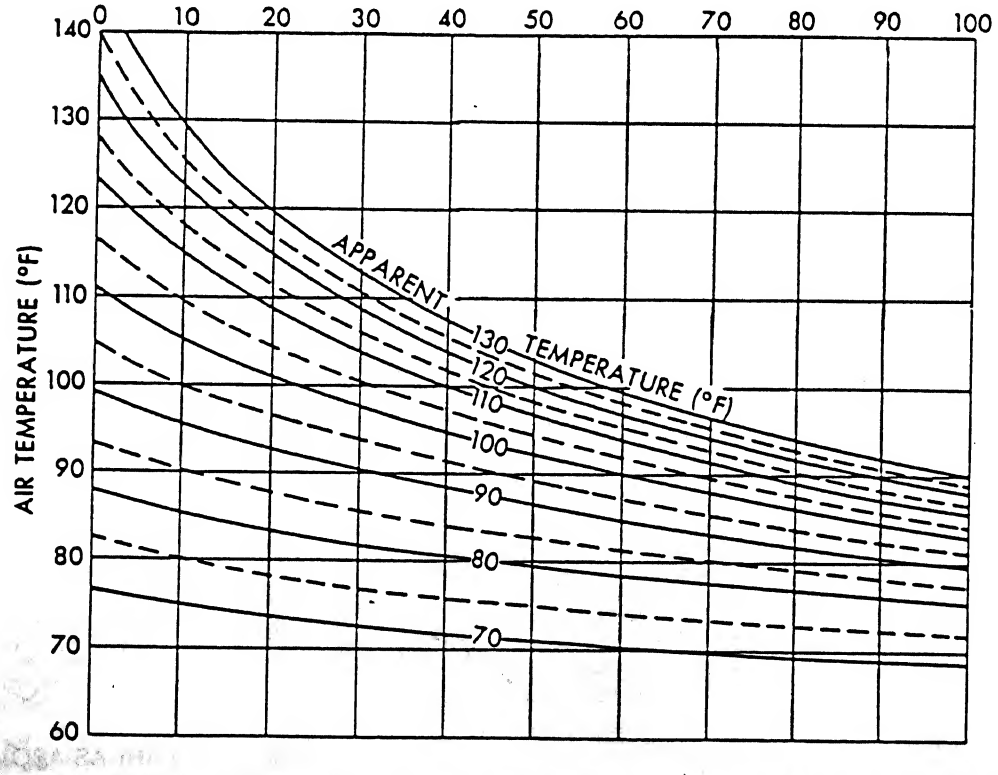
The apparent temperature as used here does not consider the effects of air movement (wind speed) or exposure to sunshine on the degree of discomfort or stress.

Reference: Steadman, R. G., 1979: The Assessment of Sultriness. Part I: A Temperature-Humidity Index Based on Human Physiology and Clothing Science. (*Journal of Applied Meteorology,* Vol. 18, pp. 861-873.)

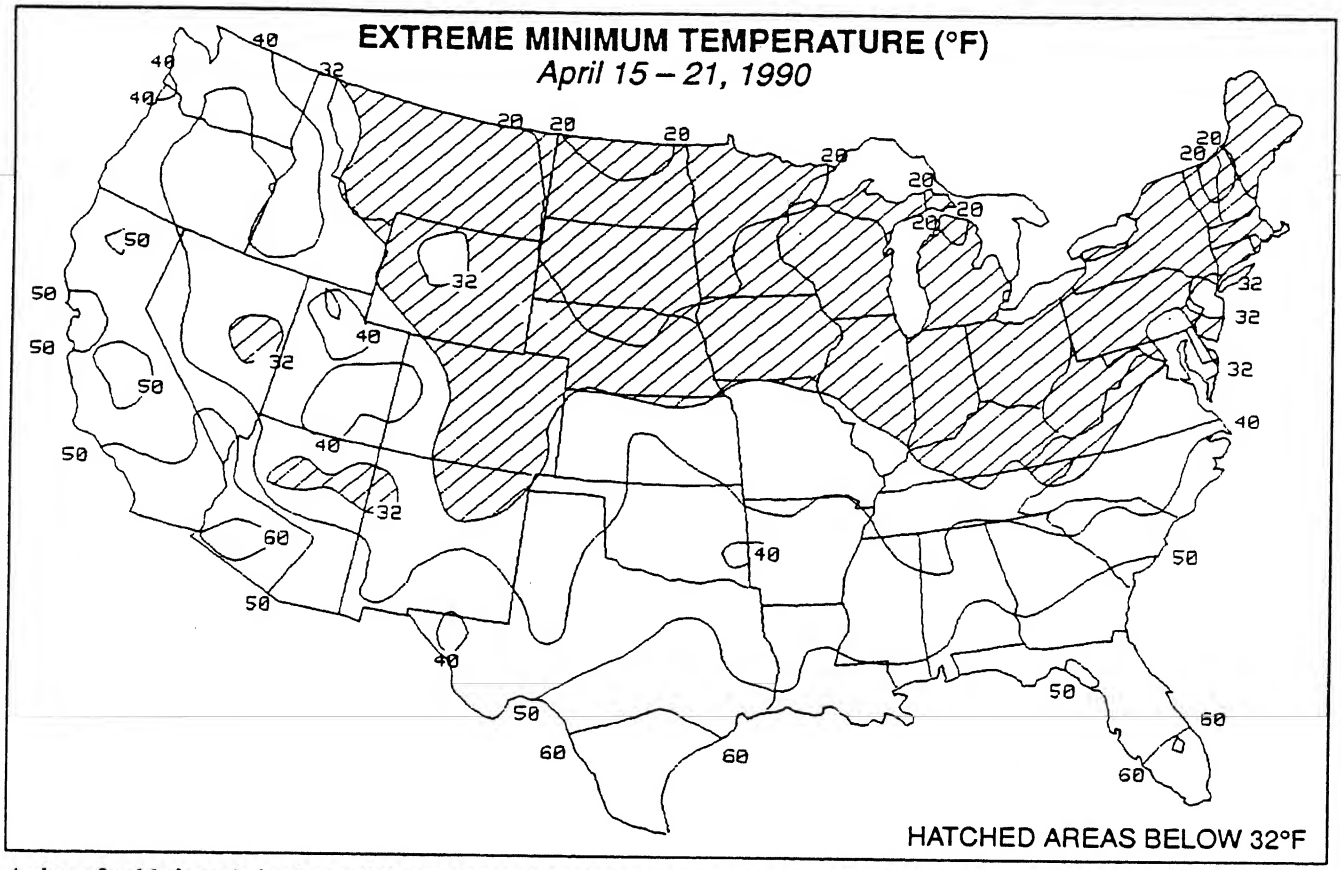
GENERAL HEAT STRESS INDEX

DANGER CATEGORY	APPARENT TEMPERATURE (°F)	HEAT SYNDROME
IV. EXTREME DANGER	GREATER THAN 130°	HEATSTROKE OR SUNSTROKE IMMINENT.
III. DANGER	105° - 130°	SUNSTROKE, HEAT CRAMPS, OR HEAT EXHAUSTION LIKELY. HEAT STROKE POSSIBLE WITH PROLONGED EXPOSURE AND PHYSICAL ACTIVITY.
II. EXTREME CAUTION	90° - 105°	SUNSTROKE, HEAT CRAMPS, AND HEAT EXHAUSTION POSSIBLE WITH PROLONGED EXPOSURE AND PHYSICAL ACTIVITY.
I. CAUTION	80° - 90°	FATIGUE POSSIBLE WITH PROLONGED EXPOSURE AND PHYSICAL ACTIVITY.

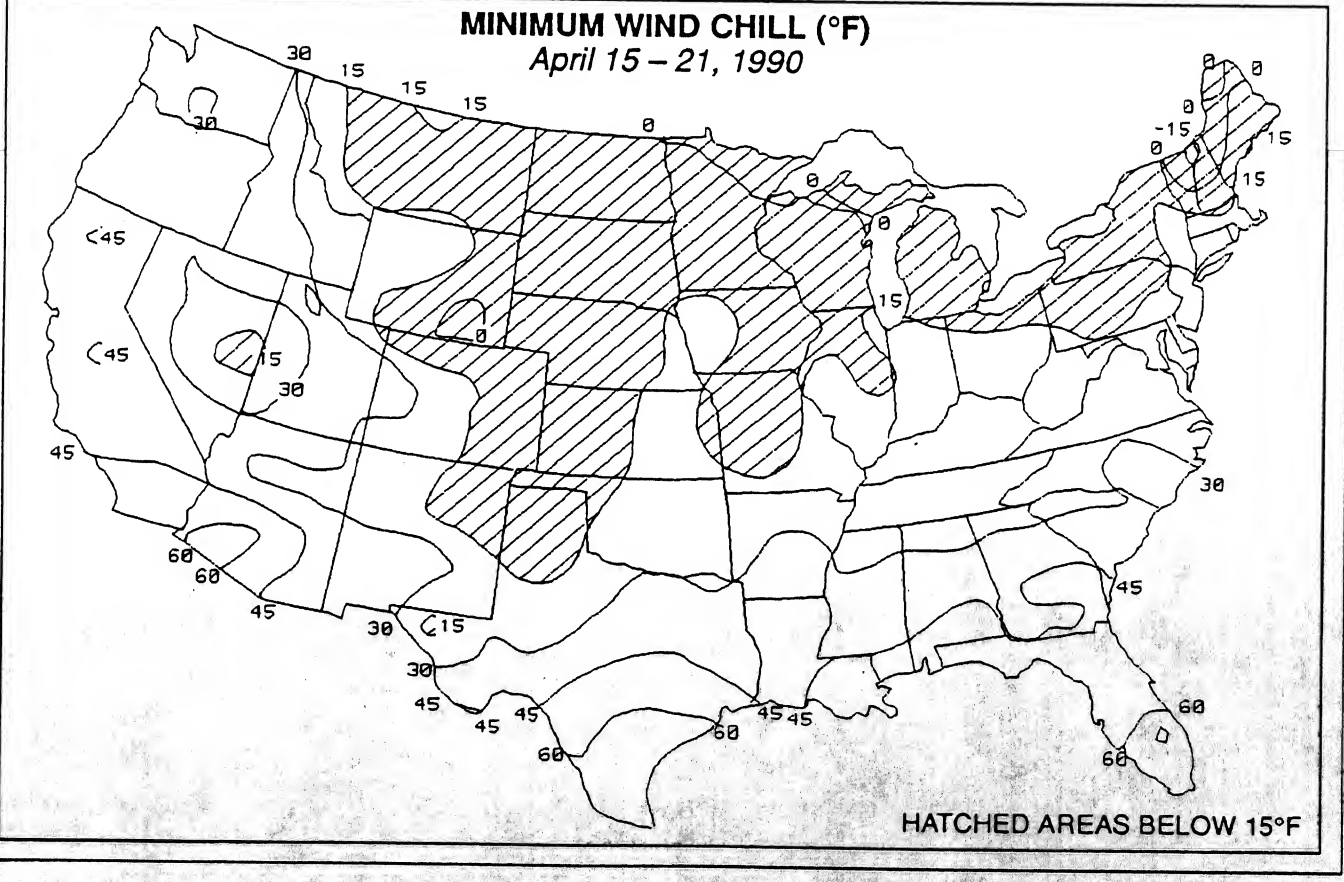
NOTE: *DEGREE OF HEAT STRESS MAY VARY WITH AGE, HEALTH, AND BODY CHARACTERISTICS.*

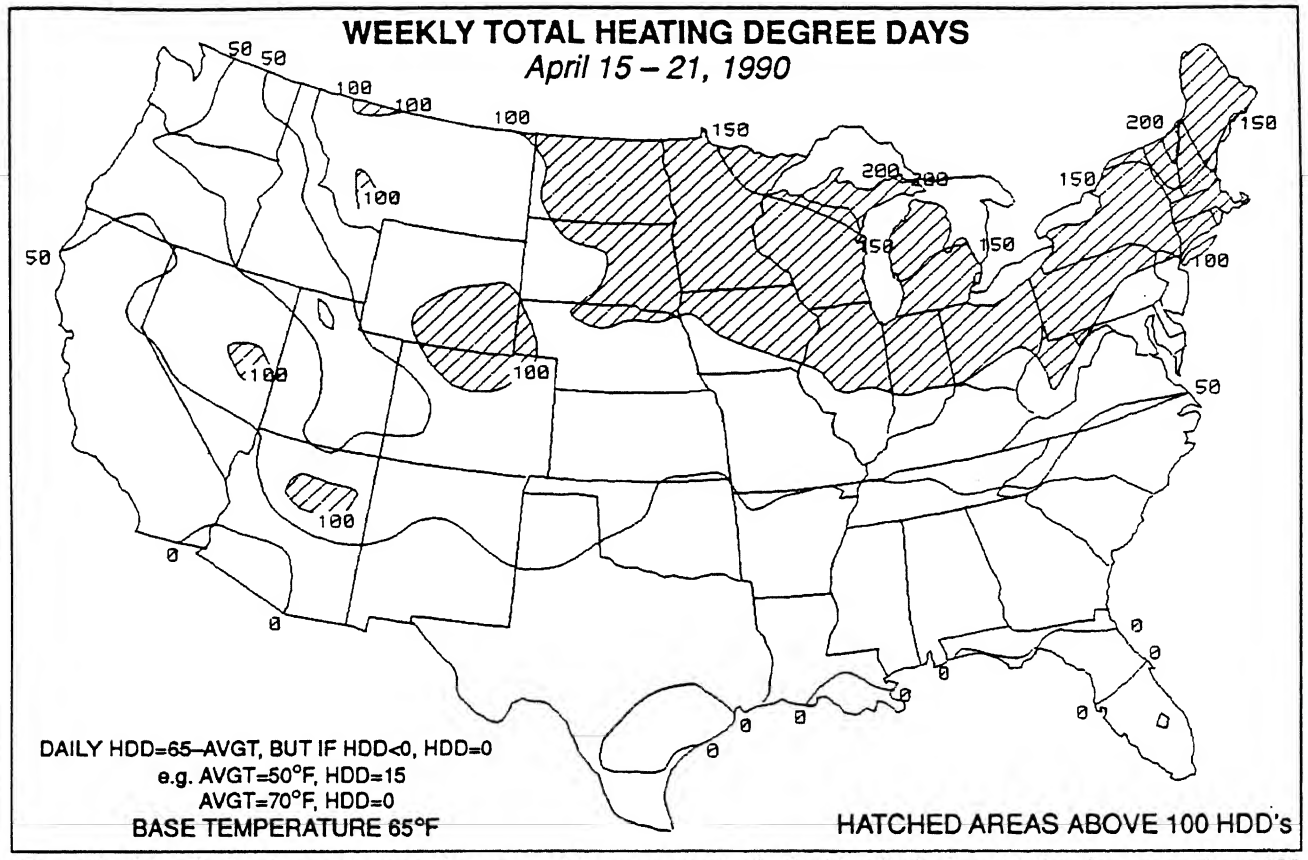


Relationship of air temperature and relative humidity to apparent temperature (after Steadman, 1979). This graph can be used for various combinations of air temperature and relative humidity. (Provided by National Climatic Data Center, NESDIS, NOAA.)

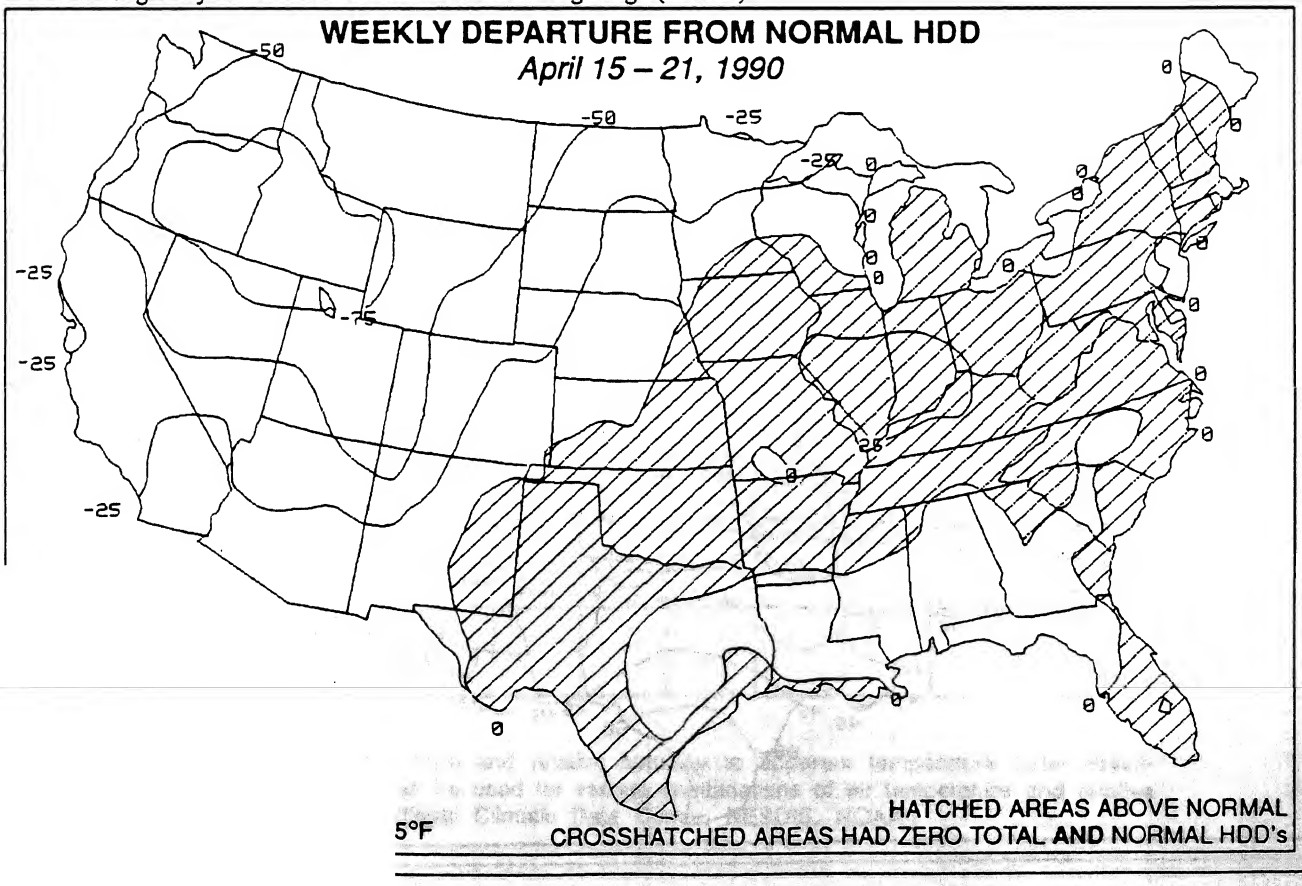


A shot of cold air early in the week brought sub–freezing temperatures to much of the northern half of the nation east of the Rockies and lows in the teens in the northern Great Plains and upper Midwest (top). Low temperatures and gusty winds produced wind chills below 15°F across much of the north–central and northeastern U.S. (bottom).



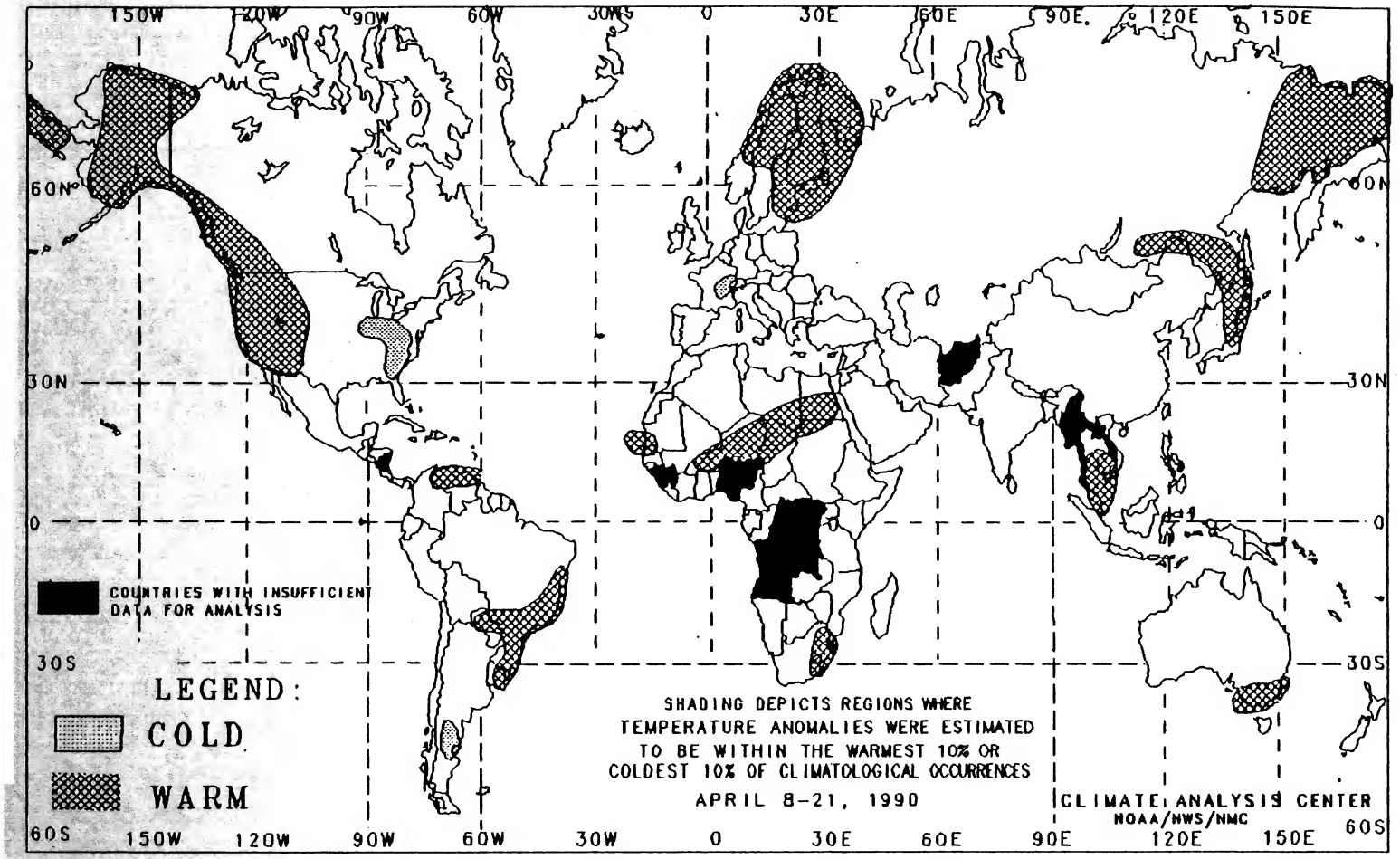


Normally rising Spring temperatures and unseasonably warm weather in the West limited weekly heating usage above 100 HDDs to the northern Great Plains, upper Midwest, Great Lakes, and Northeast (top). Slightly below normal temperatures in the eastern half of the country produced slightly above normal heating demand in the region while very warm conditions in the West greatly diminished the area's usual heating usage (bottom).



GLOBAL TEMPERATURE ANOMALIES

2 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty–four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

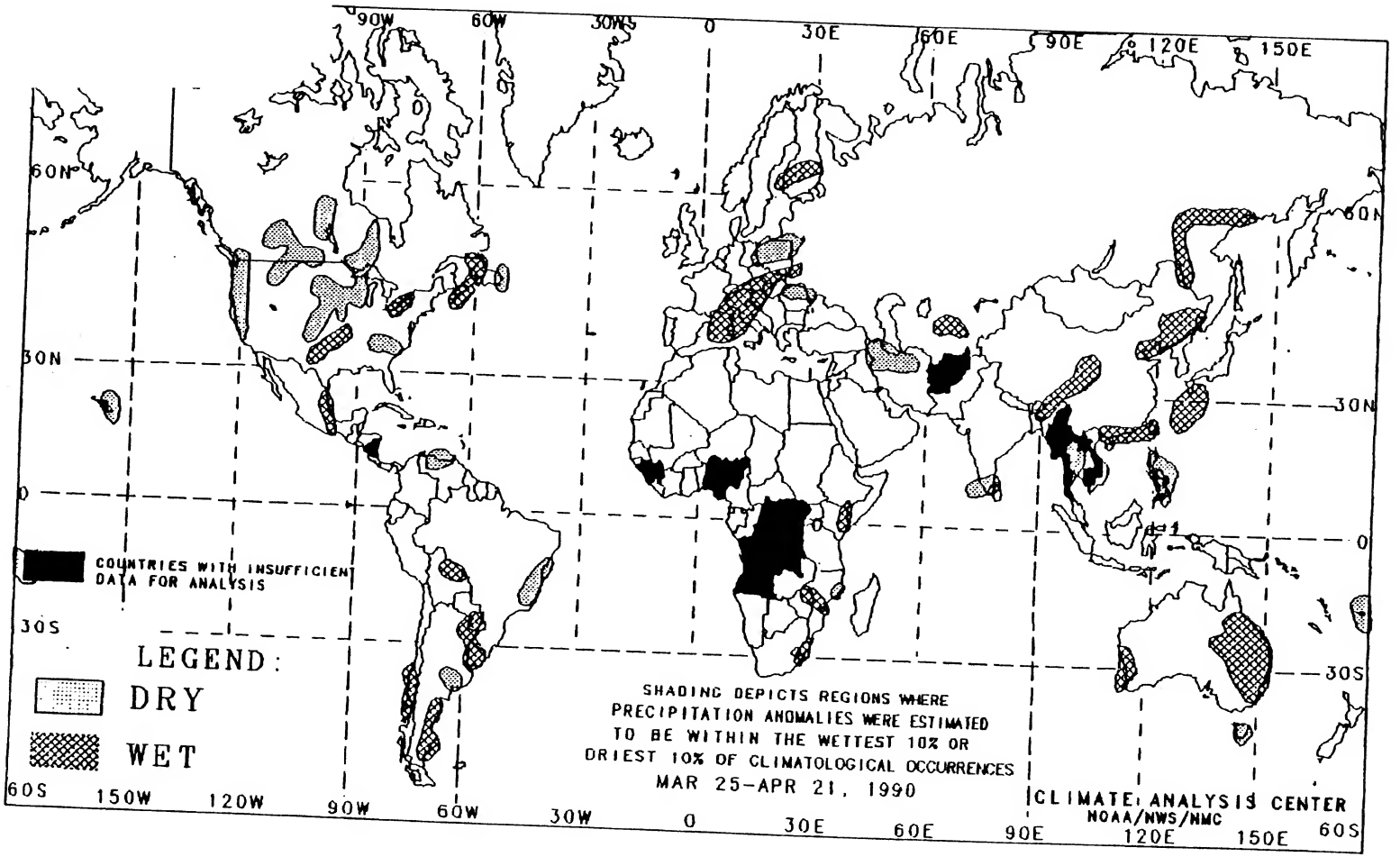
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

PRECIPITATION ANOMALIES

4 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

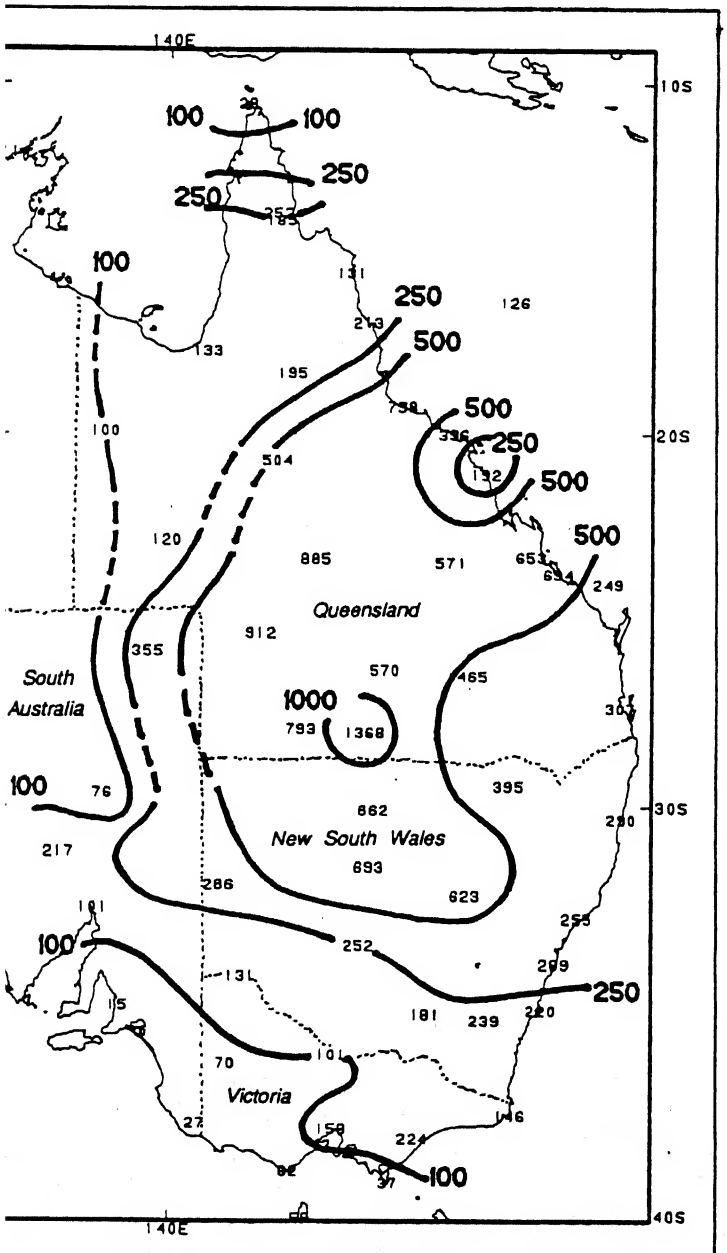
In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

SPECIAL CLIMATE SUMMARY

CLIMATE ANALYSIS CENTER, NMC
NATIONAL WEATHER SERVICE, NOAA

AUSTRALIA: "BIG WET" FOLLOWS EXTREME DROUGHT IN QUEENSLAND



igure 1. Percent of normal precipitation during March -April 21, 1990 (35 days). A station required 80% 8 days) or more of the days for inclusion. Isopleths e drawn for 100, 250, 500, and 1000%. More than times the normal rainfall inundated parts of eastern ıstralia the past 5 weeks, causing widespread severe oding and devastation. Previously, most of eastern ıstralia, especially Queensland, experienced tremely dry conditions.

This week's torrential downpours, coupled with generous rainfall since mid–March, have inundated much of eastern Australia, specifically Queensland, New South Wales, and Victoria, and caused severe widespread flooding, the loss of several lives, and untold agricultural and property damage. The exceptionally heavy rains occurred as the rainy season in northern Australia normally draws to a close.

This season's rainy season, as summarized in the Weekly Climate Bulletin #90/8 dated February 24, 1990, pages 9–14, was abnormally dry in northeastern Australia, especially along Queensland's coastline. The October–March period usually accounts for more than 75% of the annual precipitation in the northern third of the continent. From October 1, 1989–March 17, 1990, before the rains began to substantially increase, much of this region recorded under half the normal precipitation (see Figure 2), and deficits had accumulated to more than 400 mm (see Figure 3).

Around early March, however, significant rainfall began to fall along Australia's northern coast as tropical activity increased. By mid–March, Tropical Cyclone Ivor moved into the Cape York Peninsula and trekked southward, slowly dissipating over northeastern Queensland and dumping copious rainfall (over 500 mm) on parts of the state within a few days. During the last week of March, more widespread rains fell throughout Queensland and southward into New South Wales. This wet weather pattern continued into April, eventually saturating the ground and causing significant run–off into normally dry or low rivers and streams. Much of this rain also fell in a short time (e.g. from thunderstorms), producing additional run–off problems. It was only a year ago that heavy March rains, dubbed the "Big Wet" by newspapers, inundated the outback regions of central and southeastern Australia (see Weekly Climate Bulletin #89/11 and #89/12).

Since mid–March, rainfall totals have exceeded 100 mm throughout most of the eastern one–third of Australia, and many locations have measured well over 200 mm during the past five weeks (see front cover). As previously mentioned, the rainy season usually draws to an end in April in northern Australia, so weekly normal rainfall amounts are generally small this time of the year. Not surprisingly, the percent of normal precipitation since March 18 depicts a large area of eastern Australia with more than 5 times the usual rainfall (see Figure 1).

According to press reports, this was Australia's worst floods in a century. Queensland was hardest hit by the floods as an estimated 570,000 square km., or around one–third of the state, was under water, authorities said. More than a dozen towns were isolated and 30,000 people cut off in an area twice the size of Britain. The floodwaters reached 12.5 meters deep in some areas, forcing the wholesale evacuation of some towns. The Australian National Weather Service warned that 14 rivers were likely to break their banks on Monday (April 21) or Tuesday (April 22).

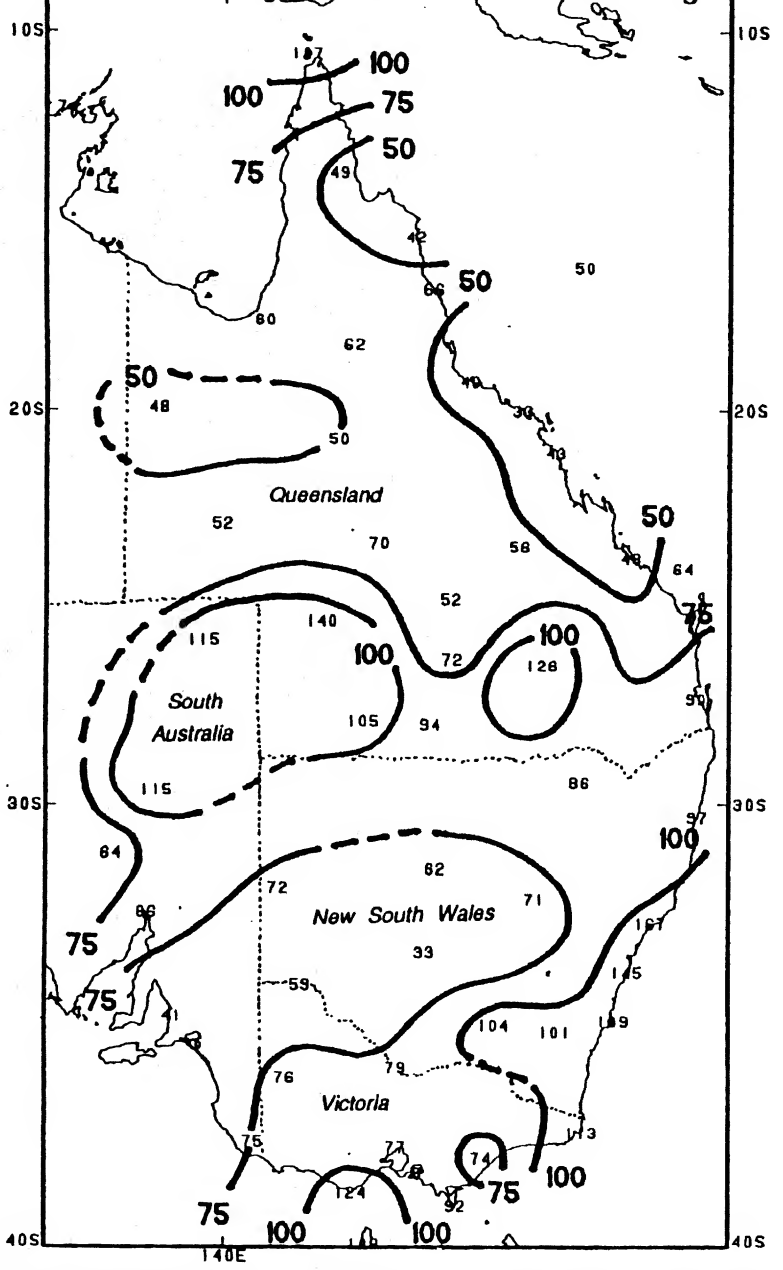


Figure 2. Percent of normal precipitation during October 1, 1989-March 18, 1990 (169 days). A station required 80% (135 days) or more of the days for inclusion. Isopleths are drawn for 50, 75, and 100%. The normally rainy summer season was anything but wet as less than half the usual rainfall occurred across most of Queensland, severely impacting agricultural interests.

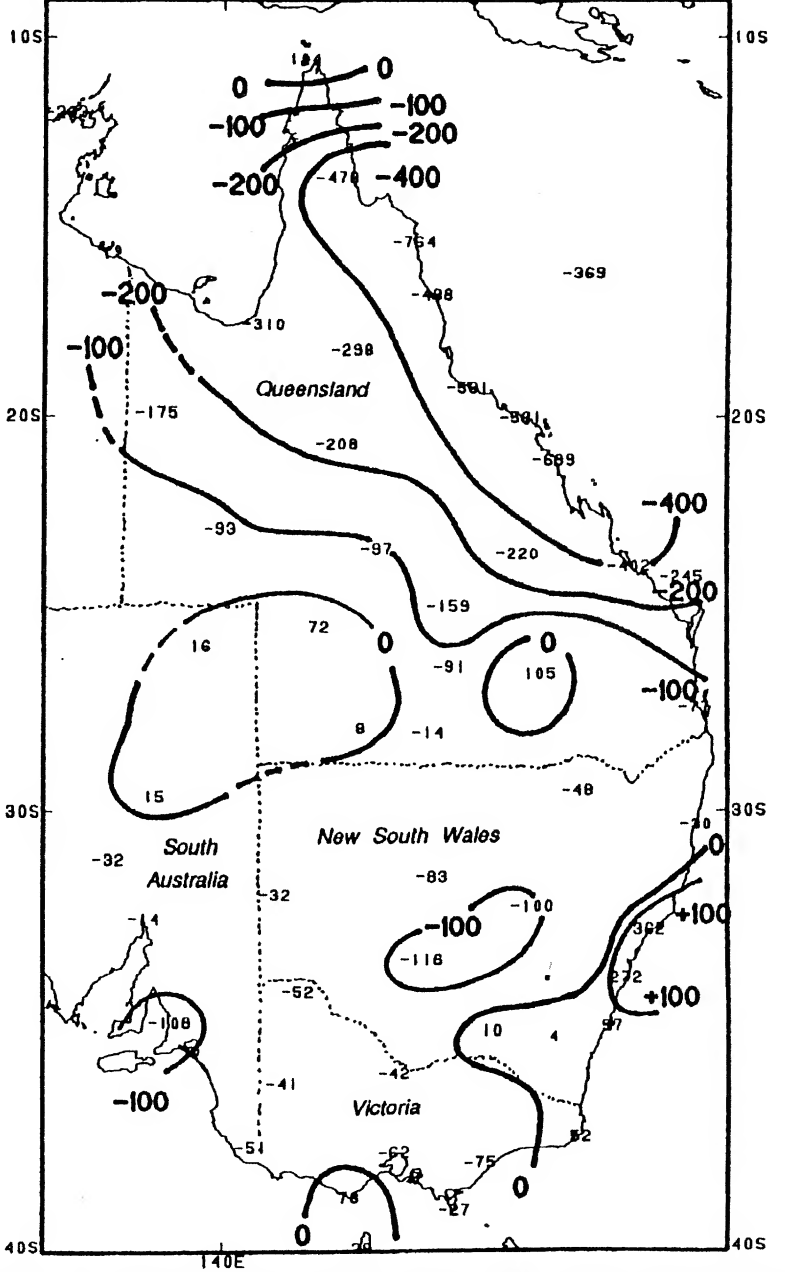


Figure 3. Departure from normal precipitation (mm) during October 1, 1989-March 18, 1990 (169 days). A station required 80% (135 days) or more of the days for inclusion. Isopleths are drawn for +100, 0, -100, -200, and -400 mm. During northern Australia's normally wet summer season, very dry conditions prevailed instead as seasonal deficits accumulated to more than 400 mm along coastal Queensland. Subnormal precipitation was also recorded in much of New South Wales and Victoria, except along the southeastern coast.